What is claimed is:

1. A method of improving a patient's gait, the method comprising:

producing a plurality of stimulation prompts at a plurality of stimulation points using multiple stimulation channels;

wherein the plurality of stimulation points are located symmetrically on each leg;

applying the plurality of stimulation prompts in a timed periodic fashion across the plurality of stimulation points;

wherein the plurality of stimulation prompts are not synchronized with the patient's gait;

wherein each of the multiple stimulation channels is associated with a stimulation electrode at one of the plurality of stimulation points; and

activating a return electrode whenever one of the multiple stimulation channels on an associated leg is active.

2. The method of claim 1, wherein the plurality of stimulation prompts each have a stimulation pulse period of approximately 14 milliseconds.

3. The method of claim 1, wherein the plurality of stimulation points are associated with a plurality of muscles and contraction of the plurality of muscles is not coincident with the corresponding stimulation prompt.

4. The method of claim 1, further comprising setting the intensity of the plurality of stimulation prompts below motor threshold for muscles associated with the plurality of stimulation points.

5. The method of claim 1, further comprising setting the amplitude of the plurality of stimulation prompts below motor thresholds to facilitate central nervous system induced contractions of muscles associated with the plurality of stimulation points.

6. The method of claim 1, further comprising setting the duration of the plurality of stimulation prompts to facilitate central nervous system induced fused contractions of muscles associated with the plurality of stimulation points.

7. The method of claim 1, wherein producing a plurality of stimulation prompts at a plurality of stimulation points using multiple stimulation channels comprises producing stimulation prompts in the vicinity of motor points of the anterior tibial muscle, gastrocnemius muscle, and rectus femoris muscle on each leg.

8. The method of claim 1, wherein producing a plurality of stimulation prompts comprises sequentially producing stimulation prompts at stimulation points near the anterior tibial muscle on the right leg, the gastrocnemius muscle on the right leg, the anterior tibial muscle on the left leg, the gastrocnemius muscle of the left leg, the rectus femoris muscle of the right leg and the rectus femoris muscle of the left leg.

9. The method of claim 1, wherein each stimulation channel is individually associated with a cue clock.

10. The method of claim 9, wherein a first channel is associated with a first cue clock and stimulation pulses for an associated stimulation electrode are active when the first cue clock is active.

11. The method of claim 10, wherein the first cue clock is active during a first cue interval.

12. The method of claim 10, wherein a second channel is associated with a second cue clock and stimulation pulses for an associated stimulation electrode are active when the second cue clock is active.

13. The method of claim 12, wherein the second cue clock is active during a second half of a second cue interval.

14. The method of claim 11, wherein the first cue interval is approximately 0.4 seconds.

15. The method of claim 13, wherein the second cue interval is approximately 0.4 seconds.

16. The method of claim 12, wherein a third channel is associated with a third cue clock and stimulation pulses for an associated stimulation electrode are active when the third cue clock is active.

17. The method of claim 16, wherein the third cue clock is active during a second quarter of the first cue interval.

18. The method of claim 16, wherein the first, second and third cue clocks are associated with stimulation electrodes located on one leg.

19. The method of claim 18, wherein fourth, fifth and sixth channels are associated with fourth, fifth and sixth cue clocks, wherein the fourth, fifth and sixth cue clocks are active during the same portion of opposite cue intervals to the first, second and third cue clocks.

20. The method of claim 2, wherein the stimulation pulse has a pulse width of approximately 400 microseconds.

21. The method of claim 1, further comprising applying stimulation pulses for each of the multiple stimulation channels in a bi-phasic manner.

22. The method of claim 1, further comprising time division multiplexing stimulation pulses for each of the multiple stimulation channels.

23. The method of claim 1, wherein stimulation current for the stimulation prompts is approximately 10 milliamps.

24. A method of relieving postural instability for an individual, the method comprising:

producing a plurality of stimulation prompts at a plurality of stimulation points using multiple stimulation channels;

wherein the plurality of stimulation points are located symmetrically on both legs;

applying the plurality of stimulation prompts in a timed periodic fashion across the plurality of stimulation points;

wherein each of the multiple stimulation channels is associated with a stimulation electrode at one of the plurality of stimulation points; and

activating a return electrode whenever one of the multiple stimulation channels on an associated leg is active;

wherein the plurality of stimulation points are associated with a plurality of muscles and contraction of the plurality of muscles is not coincident with the corresponding stimulation prompt.

25. The method of claim 24, wherein the plurality of stimulation prompts each have a stimulation pulse period of approximately 14 milliseconds.

26. The method of claim 24, further comprising applying stimulation pulses for each of the multiple stimulation channels in a bi-phasic manner.

27. The method of claim 24, further comprising time division multiplexing stimulation pulses for each of the multiple stimulation channels.

28. The method of claim 26, wherein each of the stimulation pulses has a pulse width of approximately 400 microseconds.

29. The method of claim 24, further comprising setting the intensity of the plurality of stimulation prompts below motor threshold for the plurality of muscles.

30. The method of claim 24, further comprising setting the amplitude of the plurality of stimulation prompts below motor thresholds to facilitate contractions of the plurality of muscles controlled by the central nervous system..

31. The method of claim 24, further comprising setting the duration of the plurality of stimulation prompts below the duration to facilitate fused contractions of the plurality of muscles.

32. The method of claim 24, wherein producing a plurality of stimulation prompts at a plurality of stimulation points using multiple stimulation channels comprises producing stimulation prompts in the vicinity of motor points of the anterior tibial muscle, gastrocnemius muscle, and rectus femoris muscle on each leg.

33. The method of claim 24, wherein producing a plurality of stimulation prompts comprises sequentially producing stimulation prompts in the vicinity of motor points of the anterior tibial muscle on the right leg, the gastrocnemius muscle on the right leg, the anterior tibial muscle on the left leg, the gastrocnemius muscle of the left leg, the rectus femoris muscle of the right leg and the rectus femoris muscle of the left leg.

34. The method of claim 24, wherein the multiple stimulation channels comprise three stimulation channels for each leg wherein each of the three stimulation channels is individually associated with a cue clock.

35. The method of claim 34, wherein a first channel and a third channel is associated with a first cue clock and stimulation pulses for associated stimulation electrodes are active when the first cue clock is active.

36. The method of claim 35, wherein the first cue clock is active during a first half of the first cue interval.

37. The method of claim 34, wherein a second channel and fourth channel are associated with a second cue clock and stimulation pulses for associated stimulation electrodes are active when the second cue clock is active.

38. The method of claim 37, wherein the second cue clock is active during a second half of the first cue interval.

39. The method of claim 38, wherein the first and second cue intervals are each approximately 0.4 seconds.

40. The method of claim 36, wherein a fifth and sixth channel are associated with a third cue clock and stimulation pulses for associated stimulation electrodes are active when the third cue clock is active.

41. The method of claim 40, wherein the third cue clock is active during a second half of a second cue interval.

42. The method of claim 40, wherein the first, second and fifth channels are associated with stimulation electrodes located on one leg.

43. A method of improving arm swing, the method comprising:

producing a plurality of stimulation prompts at a plurality of stimulation points using multiple stimulation channels;

wherein the plurality of stimulation points are located to prompt arm swing;

applying the plurality of stimulation prompts in a timed periodic fashion across the plurality of stimulation points;

wherein the plurality of stimulation prompts are not synchronized with the arm swing;

wherein each of the multiple stimulation channels is associated with a stimulation electrode at one of the plurality of stimulation points; and

activating a return electrode whenever one of the multiple stimulation channels is active.

44. The method of claim 43, wherein the plurality of stimulation prompts each have a stimulation pulse period of approximately 14 milliseconds.

45. The method of claim 43, further comprising applying alternating phase stimulation pulses for each of the multiple stimulation channels.

46. The method of claim 43, further comprising time division multiplexing stimulation pulses for each of the multiple stimulation channels.

47. The method of claim 43, wherein each of the stimulation pulses has a pulse width of approximately 200 microseconds.

48. The method of claim 43, wherein the plurality of stimulation points are associated with a plurality of muscles and contraction of the plurality of muscles is not coincident with the corresponding stimulation prompt.

49. The method of claim 48, further comprising setting the intensity of the plurality of stimulation prompts below motor threshold for the plurality of muscles.

50. The method of claim 48, further comprising setting the amplitude of the plurality of stimulation prompts below motor thresholds to facilitate central nervous system induced contractions of the plurality of muscles.

51. The method of claim 48, further comprising setting the duration of the plurality of stimulation prompts below the duration to facilitate central nervous system induced fused contractions of the plurality of muscles.

52. The method of claim 43, wherein producing a plurality of stimulation prompts at a plurality of stimulation points using multiple stimulation channels comprises producing stimulation prompts in the vicinity of motor points of the triceps and brachioradialis muscles on one arm.

53. The method of claim 43, wherein producing a plurality of stimulation prompts at a plurality of stimulation points using multiple stimulation channels further comprises producing stimulation prompts in the vicinity of motor points of the anterior deltoid and posterior deltoid muscles of the associated shoulder.

54. The method of claim 43, wherein producing a plurality of stimulation prompts comprises sequentially producing stimulation prompts in the vicinity of motor points of the triceps, brachioradialis, anterior deltoid and posterior deltoid.

55. The method of claim 43, wherein the multiple stimulation channels comprise two stimulation channels wherein each of the two stimulation channels is individually associated with a cue clock.

56. The method of claim 43, wherein the multiple stimulation channels comprise four stimulation channels wherein first and second of the stimulation channels is associated with a first cue clock and third and fourth of the stimulation channels is associated with a second cue clock.

57. The method of claim 56, wherein stimulation pulses for associated stimulation electrodes are active when the first cue clock is active and stimulation pulses for associated stimulation electrodes are active when the second cue clock is active.

58. The method of claim 57, wherein the first cue clock is active during the first cue interval and the second cue clock is active during the second cue interval.

59. The method of claim 58, wherein the first and second cue intervals are each approximately 0.4 seconds.

60. A method of reducing tremor for individuals having a movement disorder, the method comprising:

producing a plurality of stimulation prompts at a plurality of stimulation points using multiple stimulation channels;

wherein the plurality of stimulation points are located to reduce arm tremor;

applying the plurality of stimulation prompts in a timed periodic fashion across the plurality of stimulation points;

wherein the plurality of stimulation prompts are not synchronized with the tremor;

wherein each of the multiple stimulation channels is associated with a stimulation electrode at one of the plurality of stimulation points; and

activating a return electrode whenever one of the multiple stimulation channels is active.

61. The method of claim 60, wherein the plurality of stimulation prompts each have a stimulation pulse period of approximately 14 milliseconds.

62. The method of claim 60, further comprising applying bi-phase stimulation pulses for each of the multiple stimulation channels.

63. The method of claim 60, further comprising time division multiplexing stimulation pulses for each of the multiple stimulation channels.

64. The method of claim 60, wherein each of the stimulation pulses has a pulse width of approximately 200 microseconds.

65. The method of claim 60, wherein the plurality of stimulation points are associated with a plurality of muscles and contraction of the plurality of muscles is not coincident with the corresponding stimulation prompt.

66. The method of claim 60, wherein producing a plurality of stimulation prompts at a plurality of stimulation points using multiple stimulation channels comprises producing stimulation prompts in the vicinity of motor points of the brachioradialis, pronator teres, radialis brevis, radialis longus and extensor ulnaris muscles on one arm.

67. The method of claim 60, wherein producing a plurality of stimulation prompts comprises sequentially producing stimulation prompts in the vicinity of motor points of the brachioradialis, pronator teres, radialis brevis, radialis longus and extensor ulnaris muscles on one arm.

68. The method of claim 60, wherein the multiple stimulation channels comprise five stimulation channels wherein each of the five stimulation channels is slaved to a first and a second cue clock.

69. The method of claim 68, wherein stimulation pulses for associated stimulation electrodes are active when the first cue clock is active and when the second cue clock is active.

70. The method of claim 69, wherein the first cue clock is active during a first cue interval and the second cue clock is active during a second cue interval.

71. The method of claim 70, wherein the first and second cue intervals are each approximately 0.1 seconds and are separated by a cue delay of 0.5 seconds.

72. A movement timing stimulator system for the treatment of symptoms of Parkinson's Disease, the system comprising:

one or more motion sensors adapted to detect one or more movement parameters of a patient;

a control panel;

a plurality of customized parameter setting menus;

an over voltage/current monitoring circuit;

a controller that receives signals from the one or more motion sensors, control panel, customized parameter setting menus, and monitoring circuit and determines when stimulation prompts are required for a desired treatment of symptoms;

a plurality of cutaneous stimulation electrodes placed in the vicinity of motor points for timed periodic stimulation prompts, wherein the stimulation prompts are sequentially applied based on the desired treatment of symptoms; and

wherein the plurality of stimulation prompts are produced using multiple stimulation channels and each stimulation channel is associated with a cue clock;

wherein the stimulation prompts are not synchronized with a patient's movement;

at least one return electrode coupled to each of the plurality of stimulation electrodes.

73. The system of claim 72, further comprising an electromyograph coupled to the controller and producing a record of the electrical activity of one or more associated muscles processed to detect neurological states..

74. The system of claim 72, further comprising a stimulation pulse generator and a stimulation voltage/current generator responsive to the controller in producing the timed periodic stimulation prompts.

75. The system of claim 72, wherein the stimulation points are associated with a plurality of muscles and contraction of the plurality of muscles is not coincident with the corresponding stimulation prompt.

76. The system of claim 75, wherein the intensity of the plurality of stimulation prompts is set below motor threshold for muscles associated with the stimulation points.

77. The system of claim 75, wherein the amplitude of the plurality of stimulation prompts is set below motor thresholds to facilitate central nervous system induced contractions of muscles associated with the stimulation points.

78. The system of claim 72, wherein the cutaneous stimulation electrodes comprise cutaneous electrical stimulation electrodes.

79. The system of claim 72, wherein the cutaneous stimulation electrodes comprise cutaneous mechanical stimulation electrodes.

80. The system of claim 72, wherein the one or more motion sensors comprise at least one accelerometer.

81. A system for the treatment of symptoms of Parkinson's Disease, the system comprising:

a plurality of movement timing stimulator (MTS) systems, each MTS system including:

one or more motion sensors adapted to detect one or more movement parameters of a patient;

a control panel;

a plurality of customized parameter setting menus;

an over voltage/current monitoring circuit;

a controller that receives signals from the one or more motion sensors, control panel, customized parameter setting menus, and monitoring circuit and determines when stimulation prompts are required for a desired treatment of symptoms;

a plurality of cutaneous stimulation electrodes placed in the vicinity of motor points for timed periodic stimulation prompts, wherein the stimulation prompts are sequentially applied based on the desired treatment of symptoms; and

wherein the plurality of stimulation prompts are produced using multiple stimulation channels and each stimulation channel is associated with a cue clock;

wherein the stimulation prompts are not synchronized with a patient's movement;

at least one return electrode coupled to each of the plurality of stimulation electrodes; and

a synchronization interface that provides coordinated stimulation across the plurality of MTS systems.

82. The system of claim 81, wherein one or more of the MTS systems further includes an electromyograph coupled to the controller and producing a record of the electrical activity of one or more associated muscles processed to detect neurological states.

83. The system of claim 81, wherein each of the MTS systems further include a stimulation pulse generator and a stimulation voltage/current generator responsive to the controller in producing the timed periodic stimulation prompts.

84. The system of claim 81, wherein the stimulation points are associated with a plurality of muscles and contraction of the plurality of muscles is not coincident with the corresponding stimulation prompt.

85. The system of claim 84, wherein the intensity of the plurality of stimulation prompts is set below motor threshold for muscles associated with the stimulation points.

86. The system of claim 84, wherein the amplitude of the plurality of stimulation prompts is set below motor thresholds to facilitate central nervous system induced contractions of muscles associated with the stimulation points.

87. The system of claim 84, wherein the cutaneous stimulation electrodes comprise cutaneous electrical stimulation electrodes.

88. The system of claim 84, wherein the cutaneous stimulation electrodes comprise cutaneous mechanical stimulation electrodes.

89. The system of claim 84, wherein the one or more motion sensors comprise at least one accelerometer.

90. A method of reducing habituation in improving a patient's gait, the method comprising:

producing a plurality of stimulation prompts at a plurality of stimulation points using multiple stimulation channels;

wherein the plurality of stimulation points are located symmetrically on each leg;

applying the plurality of stimulation prompts in a timed periodic fashion across the plurality of stimulation points;

wherein the plurality of stimulation prompts are not synchronized with the patient's gait;

wherein each of the multiple stimulation channels is associated with a stimulation electrode at one of the plurality of stimulation points; and

activating a return electrode whenever one of the multiple stimulation channels on an associated leg is active;

linearly changing a pulse period for the plurality of stimulation prompts.

91. A movement timing stimulator system for the treatment of movement disorders, the system comprising:

a plurality of cutaneous stimulation electrodes placed in the vicinity of motor points for timed periodic stimulation prompts, wherein the stimulation prompts are sequentially applied to improve gait for the patient; and

a controller that receives signals from one or more of motion sensors, patient input, the stimulation electrodes, and an over voltage/current monitoring circuit;

wherein the plurality of stimulation prompts are produced using multiple stimulation channels and each stimulation channel is associated with a cue clock;

wherein the plurality of stimulation prompts are not synchronized with the patient's gait;

wherein each of the multiple stimulation channels is associated with a stimulation electrode at one of the plurality of stimulation points.

92. The system of claim 91, wherein the plurality of cutaneous stimulation electrodes are placed in the vicinity of motor points on each leg.

93. The system of claim 91, wherein the plurality of cutaneous stimulation electrodes are placed in the vicinity of motors points of the anterior tibial muscle, gastrocnemius muscle and rectus femoris muscle of each leg.

94. The system of claim 91, wherein the plurality of cutaneous stimulation electrodes are placed at stimulation points near the anterior tibial muscle on the right leg, the gastrocnemius muscle on the right leg, the anterior tibial muscle on the left leg, the gastrocnemius muscle of the left leg, the rectus femoris muscle of the right leg and the rectus femoris muscle of the left leg.

95. A movement timing stimulator system for the treatment of movement disorders, the system comprising:

a plurality of cutaneous stimulation electrodes placed at stimulation points in the vicinity of motor points for timed periodic stimulation prompts, wherein the stimulation prompts are sequentially applied to relieve postural instability for the patient; and

a controller that receives signals from one or more of motion sensors, patient input, the stimulation electrodes, and an over voltage/current monitoring circuit;

wherein the plurality of stimulation prompts are produced using multiple stimulation channels and each stimulation channel is associated with a cue clock;

wherein the plurality of stimulation prompts are not synchronized with the patient's gait;

wherein each of the multiple stimulation channels is associated with a stimulation electrode at one of the plurality of stimulation points.

96. The system of claim 95, wherein the plurality of cutaneous stimulation electrodes are placed in the vicinity of motor points on each leg.

97. The system of claim 95, wherein the stimulation prompts are produced in the vicinity of motors points of the anterior tibial muscle, gastrocnemius muscle and rectus femoris muscle of each leg.

98. The system of claim 95, wherein the plurality of cutaneous stimulation electrodes are placed at stimulation points near the anterior tibial muscle on the right leg, the gastrocnemius muscle on the right leg, the anterior tibial muscle on the left leg, the gastrocnemius muscle of the left leg, the rectus femoris muscle of the right leg and the rectus femoris muscle of the left leg.

99. A movement timing stimulator system for the treatment of movement disorders, the system comprising:

a plurality of cutaneous stimulation electrodes placed at stimulation points in the vicinity of motor points for timed periodic stimulation prompts, wherein the stimulation prompts are sequentially applied to improve arm swing for the patient; and

a controller that receives signals from one or more of motion sensors, patient input, the stimulation electrodes, and an over voltage/current monitoring circuit;

wherein the plurality of stimulation prompts are produced using multiple stimulation channels and each stimulation channel is associated with a cue clock;

wherein the plurality of stimulation prompts are not synchronized with the patient's gait;

wherein each of the multiple stimulation channels is associated with a stimulation electrode at one of the plurality of stimulation points.

100. The system of claim 99, wherein the plurality of cutaneous stimulation electrodes are placed in the vicinity of motor points on an arm.

101. The system of claim 99, wherein the stimulation prompts are produced in the vicinity of motors points of the triceps and brachioradialis muscles on one arm.

102. The system of claim 101, wherein stimulation prompts further produced in the vicinity of motor points of the anterior deltoid and posterior deltoid muscles of an associated shoulder.